Global Hydrology Resource Center

Data User Guide

GPM Ground Validation NASA Micro Rain Radar (MRR) IPHEx

Introduction

The GPM Ground Validation NASA Micro Rain Radar (MRR) IPHEx is a vertically pointing Doppler radar that obtained measurements of vertical velocity, drop size distribution, rainfall rate, attenuation, liquid water content, and reflectivity factor during the Integrated Precipitation and Hydrology Experiment (IPHEx), which took place in western North Carolina during the spring of 2014. The data are in ASCII format.

Citation

Petersen, W., P. Gatlin, and M. Wingo. 2015. GPM Ground Validation NASA Micro Rain Radar (MRR) IPHEx [indicate subset used]. Dataset available online [ftp://gpm.nsstc.nasa.gov/gpm_validation/iphex/mrr_NASA/] from the NASA EOSDIS Global Hydrology Resource Center Distributed Active Archive Center, Huntsville, Alabama, U.S.A. doi: http://dx.doi.org/10.5067/GPMGV/IPHEX/MRR/DATA203

Keywords:

GHRC, GPM GV, IPHEx; North Carolina; radar, micro rain radar, Doppler radar; vertical velocity, drop size distribution, rainfall rate, attenuation, liquid water content, reflectivity factor;

Campaign

The Global Precipitation Measurement (GPM) mission Ground Validation (GV) campaign used a variety of methods for validation of GPM satellite constellation measurements prior to launch of the GPM Core Satellite, which launched on February 27th, 2014. The validation effort included numerous GPM-specific and joint-agency/international external field campaigns, using state of the art cloud and

precipitation observational infrastructure (polarimetric radars, profilers, rain gauges, disdrometers). Surface rainfall was measured by very dense rain gauge and disdrometer networks at various field campaign sites. These field campaigns accounted for the majority of the effort and resources expended by Global Precipitation Measurement (GPM) mission Ground Validation (GV). More information about the GPM mission is available at http://pmm.nasa.gov/GPM.

The GPM Integrated Precipitation and Hydrology Experiment (IPHEx) was held in North Carolina during the months of April-June 2014. The goal of IPHEx was to characterize warm season orographic precipitation regimes and the relationship between precipitation regimes and hydrologic processes in regions of complex terrain. The IPHEx campaign was part of the development, evaluation, and improvement of remote-sensing precipitation algorithms in support of the GPM mission through NASA GPM GV field campaign (IPHEX_GVFC) and the evaluation of Quantitative Precipitation Estimation (QPE) products for hydrologic forecasting and water resource applications in the Upper Tennessee, Catawba-Santee, Yadkin-Pee Dee, and Savannah river basins (IPHEX-HAP, H4SE). NOAA Hydrometeorology Testbed (HTM) has synergy with this project. More information about IPHEx is available at http://gpm.nsstc.nasa.gov/iphex/.

Instrument Description

The GPM Ground Validation NASA Micro Rain Radar (MRR) IPHEx is a vertically pointing Doppler radar that obtained measurements of vertical velocity, drop size distribution, rainfall rate, attenuation, liquid water content, and reflectivity factor. A total of four MRRs were deployed, some co-located with other instruments and some were moved to different locations during the campaign. The dataset covers the period of April 22, 2014 through June 16, 2014, but each MRR deployed may not contain data during the entirety of this period. Two MRRs remained deployed through October 17, 2014 and data from these are also included in this dataset. More information about the MRR can be found at http://metek.de/product/mrr-2/.

Site # / Instrument	Dates	Site	Site Coordinates	Latitude	Longitude	Alitutde (m)
sn37, Pluvio, ACHIEVE	2014-04-25 to 2014-05-07	Maggie Valley	N35°31'11.28" W83°05'41.15"	35.5198	83.094764	913
sn35	2014-05-08 to 2012-06-16	Polk Co. EMA Tower	N35°17'34.29" W82°10'14.52"	35.292858	82.1707	325

	2014-04-28 to 2014-10-16	Mt. Pisgah	N35°25'32.82" W82°45'26.28"	35.425783	82.7573	1729
	2014-04-22 to 2014-06-16	Green Creek VFD	N35°13'35.71" W82°03'23.41"	35.226586	82.056503	306
	2014-06-17 to 2014-10-17	Maggie Valley	N35°31'11.28" W83°05'41.15"	35.5198	83.094764	913
sn36	2014-04-23 to 2014-06-16	Edneyville Elementary	N35°22'22.19" W82°22'11.96"	35.372831	82.369989	670

MRR2-2DVD co-located instruments

More detailed information about the GPM Ground Validation NASA Micro Rain Radar (MRR) IPHEx is available at ftp://gpm.nsstc.nasa.gov/gpm_validation/iphex/mrr_NASA/doc/DataFormat_mrr_iphex.pdf.

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File Naming Convention

The MRR dataset files are named with the following convention:

iphex_MRR2-[sn]_[date]_[site]_[latitude_longitude].tar

Where,

[sn] = MRR2 identifier
[date] = YYYYmmDD (e.g., 20110422)
[site] = name of MRR site
[latitude_longitude]=geographic location of instrument (e.g., N363442.07_W0972640.90 is North 36°34'42.07" and West 97°26'40.90")

Data Format Description

The GPM Ground Validation NASA Micro Rain Radar (MRR) IPHEx data are available in ASCII format. The data processing level for the raw data is 0, the processed/instantaneous Data is level 1, and the averaged data is level 2. More information about NASA data processing levels can be found at http://science.nasa.gov/earth-science/earth-science-data/data-processing-levels-for-eosdis-data-products/.

References

Peters, G., B. Fischer, H. Münster, M. Clemens, and A. Wagner. 2005. Profiles of Raindrop Size Distributions as Retrieved by Microrain Radars. J. Appl. Meteor., 44, 1930–1949. doi: http://dx.doi.org/10.1175/JAM2316.1

Peters, G., B. Fischer, and M. Clemens. 2010. Rain Attenuation of Radar Echoes Considering Finite-Range Resolution and Using Drop Size Distributions. J. Atmos. Oceanic Technol., 27, 829–842. doi: http://dx.doi.org/10.1175/2009JTECHA1342.1

Contact Information

To order these data or for further information, please contact:

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